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<b>TRANSMITTAL FORM</b>  (to be used for all correspondence after initial filing)	Application Number	09/488,373
	Filing Date	1/20/2000
	First Named Inventor	Toru Morita
	Art Unit	2644
	Examiner Name	Devona Faulk
Total Number of Pages in This Submission	Attorney Docket Number	SCEI 16.895

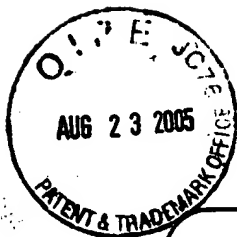
ENCLOSURES (Check all that apply)		
<input checked="" type="checkbox"/> Fee Transmittal Form <input type="checkbox"/> Fee Attached <input type="checkbox"/> Amendment / Reply <input type="checkbox"/> After Final <input type="checkbox"/> Affidavits/declaration(s) <input type="checkbox"/> Extension of Time Request <input type="checkbox"/> Express Abandonment Request <input type="checkbox"/> Information Disclosure Statement <input type="checkbox"/> Certified Copy of Priority Document(s) <input type="checkbox"/> Reply to Missing Parts/Incomplete Application <input type="checkbox"/> Reply to Missing Parts under 37 CFR 1.52 or 1.53	<input type="checkbox"/> Drawing(s) <input type="checkbox"/> Licensing-related Papers <input type="checkbox"/> Petition <input type="checkbox"/> Petition to Convert to a Provisional Application <input type="checkbox"/> Power of Attorney, Revocation Change of Correspondence Address <input type="checkbox"/> Terminal Disclaimer <input type="checkbox"/> Request for Refund <input type="checkbox"/> CD, Number of CD(s) _____ <input type="checkbox"/> Landscape Table on CD	<input type="checkbox"/> After Allowance communication to (TC) <input type="checkbox"/> Appeal Communication to Board of Appeals and Interferences <input checked="" type="checkbox"/> Appeal Communication to TC (Appeal Notice, Brief, Reply Brief) <input type="checkbox"/> Proprietary Information <input type="checkbox"/> Status Letter <input type="checkbox"/> Other Enclosure(s) (please identify below):
Remarks		

SIGNATURE OF APPLICANT, ATTORNEY, OR AGENT			
Firm Name	Katten Muchin Rosenman LLP		
Signature			
Printed name	Brian S. Myers		
Date	August 23, 2005	Reg. No.	46947

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# FEE TRANSMITTAL for FY 2005

Effective 10/01/2004. Patent fees are subject to annual revision.

☐ Applicant claims small entity status. See 37 CFR 1.27

TOTAL AMOUNT OF PAYMENT \$500.00

## Complete if Known

Application Number 09/488,373

Filing Date 1/20/2000

First Named Inventor Toru Morita

Examiner Name Devona Faulk

Art Unit 2644

Attorney Docket No. SCEI 16.895

### METHOD OF PAYMENT

☐ Check ☐ Credit Card ☐ Money Order ☐ Other

☒ Deposit Account:

Deposit Account Number 50-1290

Deposit Account Name Katten Muchin Rosenman LLP

The Director is authorized to: (check all that apply)

☒ Charge fee(s) indicated below ☒ Credit any overpayments

☒ Charge any additional fee(s) or any underpayment of fee(s)

☐ Charge fee(s) indicated below, except for the filing fee to the above-identified deposit account.

### FEE CALCULATION

#### 1. BASIC FILING FEE

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1001	790	2001	395	Utility filing fee	
1002	350	2002	175	Design filing fee	
1003	550	2003	275	Plant filing fee	
1004	790	2004	395	Reissue filing fee	
1005	160	2005	80	Provisional filing fee	

SUBTOTAL (1) \$ 0

#### 2. EXTRA CLAIM FEES FOR UTILITY AND REISSUE

Total Claims		Extra Claims		Fee from below		Fee Paid
		-20** =		X		
Independent Claims		-3** =		X		
Multiple Dependent						

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1202	18	2202	9	Claims in excess of 20	
1201	88	2201	44	Independent claims in excess of 3	
1203	300	2203	150	Multiple dependent claim, if not paid	
1204	88	2204	44	** Reissue independent claims over original patent	
1205	18	2205	9	** Reissue claims in excess of 20 and over original patent	

SUBTOTAL (2) \$ 0

\*\*or number previously paid, if greater; For Reissues, see above

### FEE CALCULATION (continued)

#### 3. ADDITIONAL FEES

Large Entity		Small Entity		Fee Description	Fee Paid
Fee Code	Fee (\$)	Fee Code	Fee (\$)		
1051	130	2051	65	Surcharge - late filing fee or oath	
1052	50	2052	25	Surcharge - late provisional filing fee or cover sheet	
1053	130	1053	130	Non-English specification	
1812	2,520	1812	2,520	For filing a request for ex parte reexamination	
1804	920*	1804	920*	Requesting publication of SIR prior to Examiner action	
1805	1,840*	1805	1,840*	Requesting publication of SIR after Examiner action	
1251	110	2251	55	Extension for reply within first month	
1252	430	2252	215	Extension for reply within second month	
1253	980	2253	490	Extension for reply within third month	
1254	1,530	2254	765	Extension for reply within fourth month	
1255	2,080	2255	1,040	Extension for reply within fifth month	
1401	340	1401	170	Notice of Appeal	
1402	500	2402	250	Filing a brief in support of an appeal	500
1403	300	2403	150	Request for oral hearing	
1451	1,510	1452	1,510	Petition to institute a public use proceeding	
1452	110	2452	55	Petition to revive - unavoidable	
1453	1,330	2453	665	Petition to revive - unintentional	
1501	1,370	2501	685	Utility issue fee (or reissue)	
1502	490	2502	245	Design issue fee	
1503	660	2503	330	Plant issue fee	
1460	130	1460	130	Petitions to the Commissioner	
1807	50	1807	50	Processing fee under 37 CFR 1.17(q)	
1806	180	1806	180	Submission of Information Disclosure Stmt	
8021	40	8021	40	Recording each patent assignment per property (times number of properties)	
1809	790	2809	395	Filing a submission after final rejection (37 CFR 1.129(a))	
1810	790	2810	395	For each additional invention to be examined (37 CFR 1.129(b))	
1801	790	2801	395	Request for Continued Examination (RCE)	
1802	900	1802	900	Request for expedited examination of a design application	

Other fee (specify):

\*Reduced by Basic Filing Fee Paid

SUBTOTAL (3) \$500

Name (Print/Type)	Brian S. Myers	Registration No. (Attorney/Agent)	46947	Telephone	212-940-8800
Signature				Date	8/23/2005



Serial No. 09/488,373  
Group Art Unit 2644  
Docket No: SCEI 16.895

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPEAL BRIEF – 37 C.F.R § 1.192

U.S. Patent Application 09/488,373 entitled,  
“Method for Generating Playback Sound, Electronic Device and Entertainment  
System for Generating Playback Sound”

**REAL PARTY IN INTEREST:** Sony Corporation

08/24/2005 JADD01 00000073 501290 09488373  
01 FC:1402 500.00 DA

**RELATED APPEALS AND INTERFERENCES:**

None

**STATUS OF CLAIMS:**

Claims 1-9 and 11-18 are pending.

Claims 1-4, 6-8, 15 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Wu (USP 4,571,680).

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto et al. (USP 6,238,291) in view of Wu.

Claims 9 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Furuhashi (USP 5,789,690) in view of Kudo et al. (USP 6,560,692) and further in view of Wu.

Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Furuhashi in view of Kudo et al., in further view of Wu and further in view of Fujimoto et al.

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto et al. in view of Wu.

Claim 17 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu in view of Saito (USP 5,576,685).

Claim 18 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu in view of Saito.

All pending claims are appealed via the current appeal brief.

**STATUS OF AMENDMENTS:**

No amendments were filed after the final rejection of 1/25/2005.

**SUMMARY OF CLAIMED SUBJECT MATTER:**

The present invention, according to claim 1, provides for a method (*see page 4, line 14 – page 5, line 9 of the application-as-filed*) for generating a clear playback sound in an electronic device (*see figures 4 and 5a-c and accompanying description in the application-as-filed*) including a CPU (*see figure 6a, element 441 in the application-as-filed*) and a speaker (*see figure 6a, element 447 in the application-as-filed*), wherein the method, according to claim 1,

comprises the steps of: dynamically altering a CPU interrupt signal in accordance with a sound data that is read from a CPU memory (*see figure 6a, element 446 in the application-as-filed*) and emitting, to a speaker (*see figure 6a, element 447 in the application-as-filed*) of the electronic device, the sound data obtained in connection with the CPU interrupt signal (*see figures 7a-b and accompanying description on page 14-16 in the application-as-filed*). According to claim1, the timing between the sound data and the timing of the CPU interrupt signal are made to agree with each other to provide a clear playback sound; a period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to a period  $T$  of the sound data; and the timing of the interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18*).

The present invention also provides for a method (*see page 4, line 14 – page 5, line 9 of the application-as-filed*) for generating clear playback sound in an electronic device (*see figures 4 and 5a-c and accompanying description in the application-as-filed*) including a CPU (*see figure 6a, element 441 in the application-as-filed*) and a speaker (*see figure 6a, element 447 in the application-as-filed*), wherein the method, according to claim 2, comprises the steps of dynamically altering a period of a CPU interrupt signal in accordance with a period  $T$  of the sound data that is read from a CPU memory (*see figure 6a, element 446 in the application-as-filed*) and emitting, to the speaker (*see figure 6a, element 447 in the application-as-filed*), sound data obtained in connection with the CPU interrupt signal (*see figures 7a-b and accompanying description on page 14-16 in the application-as-filed*), wherein the timing between the sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound. According to claim 2, the period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period  $T$  of said sound data, and the timing of interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the

rise and fall of the sound waveform is substantially eliminated by dynamically altering the period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18*).

The present invention also provides for a method (*see page 4, line 14 – page 5, line 9 of the application-as-filed*) for generating clear playback sound in an electronic device (*see figures 4 and 5a-c and accompanying description in the application-as-filed*) including a CPU (*see figure 6a, element 441 in the application-as-filed*) and a speaker (*see figure 6a, element 447 in the application-as-filed*), wherein the method, according to claim 3, comprises the steps of dynamically altering a period of a CPU interrupt signal in accordance with a period of the sound data that is read from a CPU memory (*see figure 6a, element 446 in the application-as-filed*) and emitting, to the speaker (*see figure 6a, element 447 in the application-as-filed*), sound data obtained in connection with the CPU interrupt signal (*see figures 7a-b and accompanying description on page 14-16 in the application-as-filed*), wherein the timing between said sound data and the timing of the CPU interrupt signal are made to agree with each other to provide a clear playback sound. According to claim 3, in the altering step, the period of the CPU interrupt signal is dynamically altered in correspondence with a period  $T$  of the sound data and the period of the CPU interrupt signal is dynamically altered and the period of the CPU interrupt signal is dynamically altered to  $T/n$  where  $n = 2, 3, \dots$ , and wherein the timing of the interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering the period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18*).

The present invention also provides for a method (*see page 4, line 14 – page 5, line 9 of the application-as-filed*) for generating clear playback sound in an electronic device (*see figures 4 and 5a-c and accompanying description in the application-as-filed*) including a CPU (*see figure 6a, element 441 in the application-as-filed*) and a speaker (*see figure 6a, element 447 in the application-as-filed*), wherein the method, according to claim 4, comprises the steps of

dynamically altering a period of a CPU interrupt signal in accordance with a period of sound data that is read from a CPU memory (*see figure 6a, element 446 in the application-as-filed*) and emitting, to the speaker (*see figure 6a, element 447 in the application-as-filed*), sound data obtained in connection with said CPU interrupt signal (*see figures 7a-b and accompanying description on page 14-16 in the application-as-filed*), wherein the timing between the sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound and, wherein, in the altering step, the period of the CPU interrupt signal is dynamically altered in correspondence with period  $T$  of the sound data, and the period  $t$  of the CPU interrupt signal is dynamically altered to  $T/2$ , and wherein the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18*).

The present invention, according to claim 5, provides for a method (*see page 4, line 14 – page 5, line 9 of the application-as-filed*) for clearly generating a clear playback sound, in an electronic device (*see figures 4 and 5a-c and accompanying description in the application-as-filed*) including a CPU (*see figure 6a, element 441 in the application-as-filed*), a timer unit (*see figures 7a-b, element 501 in the application-as-filed*) and a speaker (*see figure 6a, element 447 in the application-as-filed*), wherein the method comprises the steps of: reading image data and audio data under CPU control, controlling the timer unit that generates a CPU interrupt signal in accordance with the read audio data to dynamically alter the CPU interrupt signal (*see figures 8a-b and accompanying description on page 15-18*); and emitting, to the speaker, sound data obtained in accordance with the CPU interrupt signal, wherein the timing between the sound data and the timing of the CPU interrupt signal are made to agree, the burden on the CPU is reduced, and a playback sound is generated from the speaker. According to claim 5, the period of the CPU interrupt signal is dynamically altered (*see figures 8a-b and accompanying description on page 15-18*) in correspondence with a period  $T$  of the sound data and the period  $t$  of said CPU interrupt signal is dynamically altered to  $T/n$  where  $n = 2, 3, \dots$ , and wherein the timing of

interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18*).

The present invention, according to claim 6, provides for an electronic device comprising: a timer unit (*see figures 7a-b, element 501 in the application-as-filed*) that generates a CPU interrupt signal; a CPU (*see figure 6a, element 441 and figures 7a-b, element 441 in the application-as-filed*) that specifies sound data by the timing of the CPU interrupt signal; a D/A converter (*see figures 7a-b, element 506 in the application-as-filed*) that changes said sound data to an analog signal; and a speaker (*see figure 6a, element 447 in the application-as-filed*) that emits sound that corresponds to the analog signal, wherein the CPU controlling the timer unit in accordance with a period  $T$  of said sound data dynamically alters a period of the CPU interrupt signal, causing a switching timing of the sound data and the period of the CPU interrupt signal to agree, and generating a clear playback sound. According to claim 6, the period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period  $T$  of said sound data, wherein the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18*).

The present invention, according to claim 7, provides for an electronic device comprising: a timer unit (*see figures 7a-b, element 501 in the application-as-filed*) that generates a CPU interrupt signal; a CPU (*see figure 6a, element 441 and figures 7a-b, element 441 in the application-as-filed*) that specifies sound data by the timing of the interrupt signal; a D/A converter (*see figures 7a-b, element 506 in the application-as-filed*) that changes the sound data to an analog signal; and a speaker that emits sound that corresponds to the analog signal,

wherein the CPU controlling the timer means in accordance with a period of said sound data dynamically altering a period of said CPU interrupt signal, causing a switching timing of the sound data and the period of the CPU interrupt signal to agree, and generating a clear playback sound. According to claim 7, the period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period  $T$  of said sound data, and the timing of interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering the period of the CPU interrupt signal to  $T/n$  (e.g.,  $T/2$ ) (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

The present invention, according to claim 9, provides for an electronic device comprising: a clock unit (*see figures 7a-b, element 500*); a CPU (*see figures 7a-b, element 504 of the application-as-filed*); a down-counter (*see figures 7a-b, element 502 of the application-as-filed*); a timer unit (*see figures 7a-b, element 501 of the application-as-filed*) connected to said clock unit and generates an interrupt signal using said down-counter; an interrupt controller (*see figures 7a-b, element 503 of the application-as-filed*) connected to said timer unit; said CPU being connected to said interrupt controller; a bus controller (*see figures 7a-b, element 505 of the application-as-filed*) connected to said CPU; a D/A converter (*see figures 7a-b, element 506 of the application-as-filed*) connected to said bus controller; an amplification unit (*see figures 7a-b, element 507 of the application-as-filed*) connected to said D/A converter; a speaker (*see figures 7a-b, element 447 of the application-as-filed*) connected to said amplification unit; and an electronic means causing the CPU to control the down-counter based on the period of the sound data, generate the interrupt signal, determine the sound data based on the interrupt signal, emit the sound data via the bus controller and the amplification unit to said speaker, and generate a clear playback sound. According to claim 9, the CPU dynamically alters the period  $T$  of said interrupt signal to  $T/n$  (wherein  $n=2, 3, \dots$ ) when the period of the sound data is  $T$ ; and wherein the timing of the interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU

interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

The present invention, according to claim 13, provides for an entertainment system (*see figure 4 of the application-as-filed*) comprising a portable electronic device which is a child machine that is detachably mounted to a parent machine (*see figures 5a-c of the application-as-filed*), and an interface (*see figure 6a, element 442 of the application-as-filed*) for making an electrical connection to the parent machine, wherein the portable electronic device comprises: a CPU (*see figures 7a-b, element 504 of the application-as-filed*); a timer (*see figures 7a-b, element 501 of the application-as-filed*) that generates a CPU interrupt signal, wherein the CPU specifies a sound data by the timing of said CPU interrupt signal; a D/A converter (*see figures 7a-b, element 506 of the application-as-filed*) that converts the sound data to an analog signal; and a speaker (*see figures 7a-b, element 447 of the application-as-filed*) that emits sound corresponding to the analog signal; wherein the period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to a period  $T$  of the sound data, and wherein the timing of the interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering the period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

The present invention, according to claim 14, provides for an entertainment system (*see figure 4 of the application-as-filed*) comprising a portable electronic device which is a child machine that is detachably mounted to a parent machine (*see figures 5a-c of the application-as-filed*), and an interface (*see figure 6a, element 442 of the application-as-filed*) for making an electrical connection to the parent machine, wherein the portable electronic device comprises: a CPU (*see figures 7a-b, element 504 of the application-as-filed*); a timer (*see figures 7a-b, element 501 of the application-as-filed*) that generates a CPU interrupt signal, wherein the CPU

specifies a sound data by the timing of said interrupt signal; a D/A converter (*see figures 7a-b, element 506 of the application-as-filed*) that converts the sound data to an analog signal; and a speaker (*see figures 7a-b, element 447 of the application-as-filed*) that emits sound corresponding to the analog signal; wherein a period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $T$  is a period of the sound data and  $n = 2, 3, \dots$ ), and wherein the timing of the interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

The present invention, according to claim 15, provides for a method (*see page 4, line 14 – page 5, line 9 of the application-as-filed*) for generating a clear playback sound in an electronic device including a CPU (*see figure 6a, element 441 in the application-as-filed*) and a speaker (*see figure 6a, element 447 in the application-as-filed*), wherein the method comprises the steps of: dynamically altering a CPU interrupt signal, that has been generated by a timer using a down-counter, in accordance with a sound data that is read from a CPU memory; and emitting, to a speaker of the electronic device, sound data obtained in connection with the CPU interrupt signal (*see figures 7a-b and accompanying description on page 14-16 in the application-as-filed*), wherein the timing between the sound data and the timing of the CPU interrupt signal are made to agree with each other to provide a clear playback sound. According to claim 15, the sound data has a period and the CPU controls the down-counter based on the period of the sound data, wherein a period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n=2, 3, \dots$ ) with respect to a period  $T$  of the sound data; and wherein the timing of interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

The present invention, according to claim 16, provides a method (*see page 4, line 14 – page 5, line 9 of the application-as-filed*) for generating clear playback sound in an electronic device including a CPU (*see figure 6a, element 441 in the application-as-filed*) and a speaker (*see figure 6a, element 447 in the application-as-filed*), wherein the method comprises the steps of: dynamically altering a period of a CPU interrupt signal that has been generated by a timer using a down-counter in accordance with a period T of the sound data that is read from a CPU memory; and emitting, to the speaker, sound data obtained in connection with the CPU interrupt signal (*see figures 7a-b and accompanying description on page 14-16 in the application-as-filed*), wherein the timing between the sound data and the timing of the CPU interrupt signal are made to agree with each other to provide a clear playback sound, and wherein the CPU controls the down-counter based on the period T of the sound data. According to claim 16, the period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period T of the sound data, wherein the timing of interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

The present invention, according to claim 17, provides for an electronic device comprising: a timer unit (*see figures 7a-b, element 501 of the application-as-filed*) that generates a CPU interrupt signal using a down-counter (*see figures 7a-b, element 502 of the application-as-filed*); a CPU (*see figures 7a-b, element 504 of the application-as-filed*) that specifies sound data by the timing of the CPU interrupt signal; a D/A converter (*see figures 7a-b, element 506 of the application-as-filed*) that changes the sound data to an analog signal; and a speaker (*see figures 7a-b, element 447 of the application-as-filed*) that emits sound that corresponds to the analog signal; wherein the CPU, controlling said down-counter in accordance with a period T of said sound data, dynamically alters a period of the CPU interrupt signal, causing a switching timing of the sound data and the period of said CPU interrupt signal to agree,

and generating a clear playback sound. According to claim 17, the period of the CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to a period  $T$  of said sound data, and the timing of the interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

The present invention, according to claim 18, provides for an entertainment system (*see figure 4 of the application-as-filed*) comprising a portable electronic device which is a child machine that is detachably mounted to a parent machine (*see figures 5a-c of the application-as-filed*), and an interface (*see figure 6a, element 442 of the application-as-filed*) for making an electrical connection to the parent machine, wherein the portable electronic device comprises: a CPU (*see figures 7a-b, element 504 of the application-as-filed*); a timer (*see figures 7a-b, element 501 of the application-as-filed*) that generates a CPU interrupt signal using a down-counter, wherein the CPU specifies a sound data by the timing of said CPU interrupt signal; a D/A converter (*see figures 7a-b, element 506 of the application-as-filed*) that converts said sound data to an analog signal; and a speaker (*see figures 7a-b, element 447 of the application-as-filed*) that emits sound corresponding to said analog signal; wherein the CPU controls the down-counter based on a period of said sound data, and dynamically alters a period of the CPU interrupt signal, causing a switching timing of the sound data and the period of said CPU interrupt signal to agree, and generates a clear playback sound, wherein the period of said CPU interrupt signal is dynamically altered by said CPU to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period  $T$  of said sound data, and wherein the timing of interrupt corresponds to a rise or fall of a sound waveform of the sound data and discrepancy between the timing of the period of the CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by dynamically altering said period of said CPU interrupt signal to  $T/n$  (*see figures 8a-b and accompanying description on page 15-18 of the application-as-filed*).

**GROUND OF REJECTIONS TO BE REVIEWED ON APPEAL:**

- I. Was a proper rejection made under 35 U.S.C. § 102(e) using existing USPTO guidelines?
- II. Was a proper rejection made under 35 U.S. C. § 103(a) using existing USPTO guidelines?

**ARGUMENT:**

- I. Was a proper rejection made under 35 U.S.C. § 102(b) using existing USPTO guidelines?

Claims 1-4, 6-8, 15 and 16 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Wu (USP 4,571,680). To be properly rejected under 35 U.S.C. § 102(b), each and every element of the rejected claim must be shown in a single reference. Applicant contends, and as was shown in the interview of 6/7/2005, that the Wu reference fails to anticipate or render obvious many of the limitations of applicant's pending claims.

Wu teaches an electronic circuit device in a shoe (and not a portable gaming device), wherein the circuit receives square wave signals generated by an external walking sensor, counts the square signals to identify a pace number, and adjusts the tempo of a given music beat or beat sound based on the identified pace number. Applicant contends that the Wu invention regarding an electronic pace counting music shoe cannot anticipate many of the limitations of applicant's claims 1-4, 6-8, and 15-16, which teach the dynamic modification of the interrupt period, t, based on the waveform representing the original sound, a teaching that is absent in the Wu reference.

By contrast, the presently claimed invention provides a system and method for generating a clear playback sound in a portable gaming device including a CPU and a speaker. Figures 5a-c of the application-as-filed illustrate the portable gaming device of applicant's invention. Figure 6 of the application-as-filed illustrates the functional units of the portable gaming device.

Figure 8a of the application-as-filed illustrates the problems associated with a fixed interrupt period, t, and sound wave form, Sw. The sound waveform, Sw, is formed by a rectangular wave (digital data) that closely approximates the original sound from the game

software. A timer control unit sends an interrupt signal to the CPU at a fixed period, and every time this is done, the value corresponding to sound waveform Sw is read by the CPU. However, as in the prior art, if this interrupt period is fixed, the sound waveform, Sw, and the interrupt period, t, will be generated separately and independently, with no correspondence or coordination between the two. As a result, the timing of the rise and fall of the rectangular wave representing sound waveform, Sw, and the timing of the interrupt period, t, do not agree, and a discrepancy arises between the two timings. Due to this mismatch in timing, the original sound written into the game software will not be faithfully reproduced. One way to get around this problem is to shorten the interrupt period, t. But, such shortening causes the CPU to be subjected to an interrupt with greater frequency and, hence, increases the burden on the CPU (which is already burdened with other processing tasks such as image control).

The present invention solves the above mentioned problem by providing a system and method that dynamically alters the interrupt period, t, in accordance with the original sound such that the portable electronic gaming device faithfully plays back the original sound with reduced burden on the CPU.

Figure 8b of the application-as-filed illustrates the present invention's solution. When sound waveform Sw is T1, interrupt period t is generated at  $t=T1/2$ . Similarly, in the next stage, when sound waveform Sw is changed to T2, interrupt period t is generated at  $t=T2/2$ . By dynamically modifying the interrupt period, t, based on the waveform representing the original sound, the discrepancy between the timing of the interrupt period, t, and the timing of the rise and fall of the sound waveform, Sw, is eliminated. Also, since the dynamically altered interrupt period  $t=T/2$  is much longer than the usual fixed interrupt period, the frequency of generation of the interrupt signal with respect to the CPU is reduced, thereby greatly reducing the burden on the CPU.

Applicants contend that the Wu reference fails to teach or suggest a solution to solve the prior art's discrepancy in timing.

Specifically, with respect to claims 1-4, 6-8, and 15-16, applicant respectfully direct attention to column 1, lines 32-36 of the Wu reference which states that “an external walking sensor circuit generates square wave signals”, which is in sharp contradiction to the present invention. The examiner relies on this generated square wave signal as anticipating the limitation of the sound waveform as described in the applicant’s claims. However, applicant wishes to note that the sound waveform of claims 1-4, 6-8, and 15-16 correspond to sound data read from CPU memory and not a waveform received from an external walking sensor (see a limitation of claims 1-4 and 15-16: “sound data that is read from a CPU memory” and the limitation of claims 6-8: “a CPU that specifies sound data”).

Hence, applicant respectfully submit that the square wave signal generated according to the walking activity of a user in the Wu reference cannot anticipate or render obvious the limitation of a sound wave form representing sound data.

Furthermore, with respect to the rejections of claim 1-4, 6-7, and 15-16, the examiner, in pages 3-13 of the office action of 01/25/2005, refers to column 3, lines 54-64 of the Wu reference and admits that “...the time interval data indicative of the period from that the square wave pulse, in low form, coming from the walking sensor...”. This teaching is different from applicant’s claimed invention where the interrupt timing corresponds to the rise and fall of the sound wave (see the limitation of claims 1-4, 6-7, and 15-16: “the timing interrupt corresponds to a rise or fall of a sound waveform of the sound data”). Therefore, applicant contends that the prior art describes interrupts corresponding to the square wave pulse coming from the walking sensor in the show whereas applicant is claiming the interrupt corresponding to the rise and fall of a sound wave corresponding to sound data read from CPU memory.

Hence, applicant respectfully submit that the time interval data indicative of the period from that the square wave pulse, in low form, coming from the walking sensor in the Wu

reference cannot anticipate or render obvious applicant's claimed limitation of a timing interrupt that corresponds to a rise and fall of a sound waveform of sound data.

Furthermore, column 7, lines 23-27 of the Wu reference specifically recites that "the walking speed can control the tempo of music or beat sound". This is in sharp contrast to the rejected claims, wherein the period of a CPU interrupt signal is dynamically altered to  $T/n$  with respect to a period  $T$  of sound data (that is read from CPU memory and not received from an external sensor in a shoe). Hence, applicant contends that loading sounds to control the tempo of music corresponding to the walking pace of a user is not the same as dynamically altering the interrupt period,  $t$ , of a CPU interrupt signal based on the waveform representing the original sound.

Hence, applicant contends that the Wu reference fails to anticipate or render obvious many of the limitations of the rejected claims. Therefore, applicant respectfully contends that an improper rejection was made under 35 U.S.C. § 102(b).

II. Was a proper rejection made under 35 U.S.C. § 103(a) using existing USPTO guidelines?

Claim 5 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto et al. (USP 6,238,291) in view of Wu. To be properly rejected under 35 U.S.C. § 103(a), each and every element of the claims must be addressed through known prior art or be recognized as an obvious variation thereof. Applicant contends that the above mentioned specific combination of the Fujimoto et al. and Wu references fails to provide many of the limitations of applicant's claim 5.

With respect to the rejection of claim 5, the examiner still relies on the Wu reference (as recited previously) regarding limitation of dynamic modification of the interrupt period,  $t$ , based on the waveform representing the original sound. Applicant wishes to note that the above-mentioned arguments with respect to the Wu reference substantially apply to the above-rejected claims.

Furthermore, applicant contends that the Fujimoto et al. reference merely discloses a game machine that has a CPU, an image circuit and an acoustic circuit (see figure 3 of Fujimoto et al.). However, conspicuously absent in the Fujimoto reference is a relationship between the timing of the CPU's interrupt signal period and the timing of the rise and fall of the sound waveform. Hence, applicant respectfully submits that the Fujimoto et al. reference cannot remedy limitations that are not taught for by the Wu reference.

Applicant, therefore, contends that the above mentioned specific combination of the Fujimoto et al. and Wu references fails to provide many of the limitations of applicant's claim 5. Hence, applicant contends that the combination of Fujimoto et al. and Wu references fail to render obvious many of the limitations of the rejected claims. Therefore, with respect to applicant's claim 5, applicant respectfully contends that an improper rejection was made under 35 U.S.C. § 103(a).

Claims 9 and 11 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Furuhashi (USP 5,789,690) in view of Kudo et al. (USP 6,560,692) and further in view of Wu. Claim 12 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Furuhashi in view of Kudo et al., in further view of Wu and further in view of Fujimoto et al. To be properly rejected under 35 U.S.C. § 103(a), each and every element of the claims must be addressed through known prior art or be recognized as an obvious variation thereof. Applicant contends that the above mentioned specific combinations of the Fujimoto, Furuhashi, Kudo, and Wu references fails to provide many of the limitations of applicant's claims 9 and 11.

With respect to the rejection of claim 9, the examiner still relies on the Wu reference (as recited previously) regarding limitation of dynamic modification of the interrupt period,  $t$ , based on the waveform representing the original sound. Applicant wishes to note that the above-mentioned arguments with respect to the Wu reference substantially apply to the above-rejected claims.

The Furuhashi reference teaches an electronic sound source. A timer interrupt interval that is predetermined is stored in a timer interrupt interval storage 131 and is selected to be 1/240 of a second when the system load is relatively low and is selected to be 1/60 of a second when the system load is high (column 6, lines 52-58). But, conspicuously absent in the Furuhashi reference is a teaching for dynamic modification of the interrupt period,  $t$ , based on the waveform representing the original sound. Hence, the Furuhashi reference cannot remedy limitations not taught for by the Wu reference.

The Kudo reference includes an interrupt controller and a timer that are connected to a clock timer but, the Kudo reference fails to teach the dynamic modification of the interrupt period,  $t$ , based on the waveform representing the original sound.

Applicant, therefore, contends that the above mentioned specific combination of the Furuhashi, Kudo, and Wu references fails to provide many of the limitations of applicant's claims 9. Additionally, applicant wishes to note that the arguments presented for claims 9 substantially apply to dependent claims 11 and 12 as they inherit all the limitations of the claim from which they depend. Therefore, with respect to applicant's claims 9 and 11-12, applicant respectfully contends that an improper rejection was made under 35 U.S.C. § 103(a).

Claims 13 and 14 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Fujimoto et al. in view of Wu. To be properly rejected under 35 U.S.C. § 103(a), each and every element of the claims must be addressed through known prior art or be recognized as an obvious variation thereof. Applicant contends that the above mentioned specific combination of the Fujimoto and Wu references fails to provide many of the limitations of applicant's claims 13 and 14.

With respect to the rejection of claims 13 and 14, the examiner still relies on the Wu reference (as recited previously) regarding limitation of dynamic modification of the interrupt

period,  $t$ , based on the waveform representing the original sound. Applicant wishes to note that the above-mentioned arguments with respect to the Wu reference substantially apply to the above-rejected claims.

As mentioned earlier, applicant contends that the Fujimoto et al. reference merely discloses a game machine that has a CPU, an image circuit and an acoustic circuit (see figure 3 of Fujimoto et al.). However, conspicuously absent in the Fujimoto reference is a relationship between the timing of the CPU's interrupt signal period and the timing of the rise and fall of the sound waveform. Hence, applicant respectfully submits that the Fujimoto et al. reference cannot remedy limitations that are not taught for by the Wu reference.

Applicant, therefore, contends that the above mentioned specific combination of the Fujimoto and Wu references fails to provide many of the limitations of applicant's claims 13 and 14. Therefore, with respect to applicant's claims 13 and 14, applicant respectfully contends that an improper rejection was made under 35 U.S.C. § 103(a).

Claims 17 and 18 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Wu in view of Saito (USP 5,576,685). To be properly rejected under 35 U.S.C. § 103(a), each and every element of the claims must be addressed through known prior art or be recognized as an obvious variation thereof. Applicant contends that the above mentioned specific combination of the Wu and Saito references fails to provide many of the limitations of applicant's claims 17 and 18.

With respect to the rejection of claims 17 and 18, the examiner still relies on the Wu reference (as recited previously) regarding limitation of dynamic modification of the interrupt period,  $t$ , based on the waveform representing the original sound. Applicant wishes to note that the above-mentioned arguments with respect to the Wu reference substantially apply to the above-rejected claims.

Furthermore, applicant contends that the Saito reference merely discloses a timer which includes a presetable counter and is used to control time data when music information is played. The timer of Saito counts down preset data based on tempo data sent from controller and outputs an interrupt signal to the controller at a predetermined time interval (see column 3, lines 21-27 of the Saito reference). But, just as the Fujimoto, Furuhashi, Kudo, and Wu references, the Saito reference fails to teach the dynamic modification of the interrupt period,  $t$ , based on the waveform representing the original sound.

Applicant, therefore, contends that the above mentioned specific combination of the Wu and Saito references fails to provide many of the limitations of applicant's claims 17 and 18. Therefore, with respect to applicant's claims 17 and 18, applicant respectfully contends that an improper rejection was made under 35 U.S.C. § 103(a).

As has been detailed above, none of the references, cited or applied, provide for the specific claimed details of applicant's presently claimed invention, nor renders them obvious. It is believed that this case is in condition for allowance and reconsideration thereof and early issuance is respectfully requested.

**CLAIMS APPENDIX:**

1. A method for generating a clear playback sound in an electronic device including a CPU and a speaker, the method comprising the steps of:

dynamically altering a CPU interrupt signal in accordance with a sound data that is read from a CPU memory; and

emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound;

wherein a period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to a period  $T$  of said sound data, and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

2. A method for generating clear playback sound in an electronic device including a CPU and a speaker, the method comprising the steps of:

dynamically altering a period of a CPU interrupt signal in accordance with a period  $T$  of the sound data that is read from a CPU memory; and

emitting to the speaker said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound;

wherein the period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period  $T$  of said sound data, and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

3. A method for generating clear playback sound in an electronic device including a CPU and a speaker, the method comprising the steps of:

dynamically altering a period of a CPU interrupt signal in accordance with a period of the sound data that is read from a CPU memory; and

emitting to the speaker said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound;

wherein in said altering step the period of the CPU interrupt signal is dynamically altered in correspondence with a period  $T$  of said sound data, the period of the CPU interrupt signal is dynamically altered, and the period of said CPU interrupt signal is dynamically altered to  $T/n$  where  $n = 2, 3, \dots$ , and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

4. A method for generating clear playback sound in an electronic device including a CPU and a speaker, the method comprising the steps of:

dynamically altering a period of a CPU interrupt signal in accordance with a period of the sound data that is read from a CPU memory; and

emitting to the speaker said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound;

wherein in said altering step

the period of the CPU interrupt signal is dynamically altered in correspondence with period  $T$  of said sound data, and

the period  $t$  of said CPU interrupt signal is dynamically altered to  $T/2$ , and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the

timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

5. A method for clearly generating a clear playback sound, in an electronic device including a CPU, a timer unit and a speaker, the method comprising the steps of:

reading image data and audio data under CPU control,

controlling said timer unit that generates a CPU interrupt signal in accordance with said read audio data to dynamically alter said CPU interrupt signal; and

emitting to the speaker said sound data obtained in accordance with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree, the burden on the CPU is reduced, and a playback sound is generated from the speaker;

wherein the period of the CPU interrupt signal is dynamically altered in correspondence with a period  $T$  of said sound data and the period  $t$  of said CPU interrupt signal is dynamically altered to  $T/n$  where  $n = 2, 3, \dots$ , and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

6. An electronic device comprising:

a timer unit that generates a CPU interrupt signal;

a CPU that specifies sound data by the timing of said CPU interrupt signal;

a D/A converter that changes said sound data to an analog signal; and

a speaker that emits sound that corresponds to said analog signal;

said CPU controlling said timer unit in accordance with a period  $T$  of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound:

wherein the period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period  $T$  of said sound data, and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

7. An electronic device comprising:

a timer unit that generates a CPU interrupt signal;

a CPU that specifies sound data by the timing of said interrupt signal;

a D/A converter that changes said sound data to an analog signal; and

a speaker that emits sound that corresponds to said analog signal;

said CPU controlling said timer means in accordance with a period of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound;

wherein the period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to period  $T$  of said sound data, and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

8. The electronic device according to claim 7, wherein the period of said CPU interrupt signal is dynamically altered to  $T/2$ .

9. An electronic device comprising:

a clock unit;

a CPU;

a down-counter;

a timer unit connected to said clock unit and generates an interrupt signal using said down-counter;

an interrupt controller connected to said timer unit;

said CPU being connected to said interrupt controller;

a bus controller connected to said CPU;

a D/A converter connected to said bus controller;

an amplification unit connected to said D/A converter;

a speaker connected to said amplification unit; and

an electronic means causing said CPU to control said down-counter based on the period of the sound data, generate said interrupt signal, determine the sound data based on said interrupt signal, emit the sound data via said bus controller and said amplification unit to said speaker, and generate a clear playback sound, wherein said CPU dynamically alters the period  $T$  of said interrupt signal to  $T/n$  (wherein  $n=2, 3, \dots$ ) when the period of said sound data is  $T$ ; and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

10. (cancelled)

11. The electronic device according to claim 9, wherein said CPU dynamically alters the period  $t$  of said interrupt signal to  $T/2$  when the period of said sound data is  $T$ .

12. The electronic device according to claim 9, which is a portable electronic device that is detachably connected to a parent machine and can play a game independently when detached from said parent machine.

13. An entertainment system comprising a portable electronic device which is a child machine that is detachably mounted to a parent machine, and an interface for making an electrical connection to said parent machine,

said portable electronic device comprising:

a CPU;

a timer that generates a CPU interrupt signal;

said CPU specifying a sound data by the timing of said CPU interrupt signal;

a D/A converter that converts said sound data to an analog signal; and

a speaker that emits sound corresponding to said analog signal;

wherein the period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to a period  $T$  of said sound data, and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

14. An entertainment system comprising a portable electronic device which is a child machine that is detachably mounted to a parent machine, and an interface for making an electrical connection to said parent machine, said portable electronic device comprising:

a CPU;

a timer that generates a CPU interrupt signal;

said CPU specifying a sound data by the timing of said interrupt signal;

a D/A converter that converts said sound data to an analog signal; and

a speaker that emits sound corresponding to said analog signal;

wherein a period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $T$  is a period of the sound data and  $n = 2, 3, \dots$ ), and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the

timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

15. A method for generating a clear playback sound in an electronic device including a CPU and a speaker, the method comprising the steps of:

dynamically altering a CPU interrupt signal, that has been generated by a timer using a down-counter, in accordance with a sound data that is read from a CPU memory; and

emitting to a speaker of the electronic device said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound;

wherein said sound data has a period and wherein said CPU controls said down-counter based on the period of said sound data;

wherein a period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n=2, 3, \dots$ ) with respect to a period  $T$  of said sound data; and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

16. A method for generating clear playback sound in an electronic device including a CPU and a speaker, the method comprising the steps of:

dynamically altering a period of a CPU interrupt signal, that has been generated by a timer using a down-counter, in accordance with a period  $T$  of the sound data that is read from a CPU memory; and

emitting to the speaker said sound data obtained in connection with said CPU interrupt signal, wherein the timing between said sound data and the timing of said CPU interrupt signal are made to agree with each other to provide a clear playback sound;

wherein said CPU controls said down-counter based on the period  $T$  of said sound data;

wherein the period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n =$

2, 3, ...) with respect to period  $T$  of said sound data, and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

17. An electronic device comprising:

a timer unit that generates a CPU interrupt signal using a down-counter;

a CPU that specifies sound data by the timing of said CPU interrupt signal;

a D/A converter that changes said sound data to an analog signal; and

a speaker that emits sound that corresponds to said analog signal;

said CPU controlling said down-counter in accordance with a period  $T$  of said sound data, dynamically altering a period of said CPU interrupt signal, causing a switching timing of said sound data and the period of said CPU interrupt signal to agree, and generating a clear playback sound;

wherein a period of said CPU interrupt signal is dynamically altered to  $T/n$  (where  $n = 2, 3, \dots$ ) with respect to a period  $T$  of said sound data, and wherein

the timing of interrupt corresponds to a rise or fall of a sound waveform of said sound data and discrepancy between the timing of said period of said CPU interrupt signal and the timing of the rise and fall of the sound waveform is substantially eliminated by said dynamically altering said period of said CPU interrupt signal to  $T/n$ .

18. An entertainment system comprising a portable electronic device which is a child machine that is detachably mounted to a parent machine, and an interface for making an electrical connection to said parent machine,

said portable electronic device comprising:

a CPU;

a timer that generates a CPU interrupt signal using a down-counter;

said CPU specifying a sound data by the timing of said CPU interrupt signal;

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As this Appeal Brief has been timely filed within the set period of response, no petition for extension of time or associated fee is required. However, the Commissioner is hereby authorized to charge any deficiencies in the fees provided, to include an extension of time, to Deposit Account No. 50-1290.

Respectfully submitted by  
Applicant's Representative,



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